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POSSIBILITES OF A SOVIET MOON ROCKET

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The periodical Weltraumfahrt, from which this article is taken, contains contributions on space studies and astronomy, and is the organ of two societies, the Society for Space Studies in Stuttgart, and the Austrian Society for Space Studies.

According to a report of the DPA (German Press Agency), V. Abiant claimed in the Soviet newspaper Krasnyy Flot of 12 October 1951 that a moon rocket was already being planned in the Soviet Union. It is to be 60 m long, with greatest diameter 15 m, weight 1,000 tons, and 20 propulsion units with a total output of 350 million hp. The data is compared herein with various possibilities for a flight to the moon for the purpose of judging and evaluating the alleged project.

The following five cases have frequently been investigated and discussed as examples for the flight to the moon:

1. Start on the earth -- flight to the moon -- no return (moon courier)
2. Start on the earth -- repeated circling around the moon -- return
3. Start on the earth -- single circling of the moon -- return
4. Start on the outer station -- circling around moon -- return to station
5. Start on outer station -- landing on the moon -- return to station.

The last two plans presume the existence of an outer station. Therefore, they do not come into consideration in the following investigation.

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NOTES

1. By characteristic velocity (according to Oberth, "ideal propulsion"; in the literature occasionally also "ideal end-of-burning velocity") we understand the velocity which a rocket would attain without the influence of external forces. The actual velocity of flight is always smaller, since wind resistance and gravity among others act as external forces.

2. According to Oberth, R_i is the "ideal value of the mass ratios."

3. See H. Kolle, "A Method for Determining the Minimum Starting Weights and the Most Favorable Design Characteristics of Large Rockets," Forschungsbericht, No 5, May 1950, Society for Space Studies, Stuttgart.

4. See Dr E. Sanger, "The Fundamental Constructional (Design) Problems of Gas-Pressure Rocket Motors," Weltraumfahrt, No 1, February 1950, pp 2-8.

Constructional (Design) Characteristics			Project*	Moon Courier (unmanned)	Circling of Moon 1	Optimum Circling of Moon 2	Circling With Atomic Rocket
Characteristic speed	u	m/sec	?	13.5	18	15	18
Mean exhaust speed	c_m	m/sec	?	2,500	2,500	2,500	10,000
Mass ratio	R_i	-	?	230	1450	400	6
Mean cell factor	$\epsilon - G_n/G_s$	-	?	0.15	0.15	0.14	0.40
Number of stages	n	-	?	6	8	6	3
Starting weight	G_{so}	tons	1,000	1,000	1,000	1,000	1,000
Fundamental ratio	$M - \frac{G_{so}}{G_5(n)}$	-	?	3,500	66,000	650	280
Useful load of last stage	$G_5(n)$	tons	?	0.2-0.3	0.015	1.5	3.5
Thrust of last stage	P	tons	?	2,500	2,500	2,000	3,000
Number of Propulsion units	n_T	-	20	20-25	25-35	20-25	3
Propulsion output	N	hp	$350 \cdot 10^6$	$120 \cdot 10^6$	$150 \cdot 10^6$	$120 \cdot 10^6$	$320 \cdot 10^6$
Diameter	d	m	15	12	14	12	10
Length	ℓ	m	60	45	60	50	35

* Date is according to DPA Reuter, from Krasnyy Flot.

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